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Science and Technology for Tomorrow's Aerospace Forces

Success Story

MULTI-SPECTRAL SCENE GENERATION DEMONSTRATION FUNDED BY THE CENTRAL TEST AND EVALUATION INVESTMENT PROGRAM

The ability to evaluate the performance of multi-mode (radio frequency/infrared [RF/IR]) guided munition seekers in a laboratory environment will greatly enhance the development of future munitions while reducing the cost of test and evaluation.

Air Force Research Laboratory
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Accomplishment

The Munitions Directorate teamed with the Naval Air Warfare Center Weapons Division and the US Army Aviation and Missile Command to develop and demonstrate hardware-in-the-loop capabilities for evaluating multi-mode weapon sensors. Each service equipped their facility with a unique system specifically tailored to meet their test and facility requirements. In October 2000, a demonstration at Eglin AFB, Florida involved the projection of an airborne target simultaneously, in both long-wave IR and X-band RF, moving across the field of a common bore-sighted, dual-mode sensor, which detected the relative angular position of the target. The directorate's engineers will use the data collected and lessons learned as a baseline for future developments to transition this technology to other Department of Defense (DoD) laboratories and test facilities.

Background

Development of new generations of advanced, highly capable, multi-spectral, precision-guided weapons will address advanced threat systems. These weapon systems require extensive and elaborate testing to validate their effectiveness. Simultaneously, the increasing costs of live-fire testing and environmental concerns mandate fewer complete munitions evaluations in field testing. As a result, it is essential to perform realistic laboratory tests to augment field demonstrations and ensure the success of those demonstrations actually performed.

The joint service team created the Multi-Spectral Scene Generation project, a Central Test and Evaluation Investment Program-funded project, to demonstrate the technologies required to simultaneously project combined IR and RF dynamic imagery to a guided weapon seeker in a Hardware-in-the-Loop Simulator test facility.

Each service was primarily responsible for a different development area under the project. The Air Force provided the IR scene projection assets, the Army provided the scene generation capability, and the Navy worked beam combiner technologies.

The directorate reconfigured their Radio Frequency Target Simulator test facility by integrating the existing X-band RF array wall with a long-wave IR scene projector, RF/IR combiner, and surrogate dual-mode seeker composed of a quantum-well focal plane array camera and a conformal array RF antenna. Hardware-in-the-Loop Simulator test facility personnel performed many years of continuous development on the directorate's IR resistive array scene projection technology. The directorate, recognized as a world leader in the development of IR scene projection technology, continues to support the needs of the DoD laboratory and test communities.

Munitions
Emerging Technologies

Additional information

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